Transportation Synthesis Report

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Restricting Diesel Idling at Construction and Distribution Sites

Prepared for
Bureau of Equity and Environmental Services

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Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WisDOT technical staff. Online and print sources include NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs, and related academic and industry research. Internet hyperlinks in TSRs are active at the time of publication, but changes on the host server can make them obsolete.

Request for Report

The diesel engine is a highly efficient and robust power system, with low torque characteristics well suited for heavy-duty, on-road trucks and off-highway equipment. However, the emissions from these engines have a deleterious effect on both air quality and human health. A number of states have adopted laws limiting diesel vehicle and equipment idling. WisDOT's Bureau of Equity and Environmental Services asked us to gather information specifically on states' regulation of the idling of on- and off-road diesel equipment on construction projects and the idling of diesel trucks at distribution/warehouse facilities.

Summary

We present our research results in three sections.

Overview:

- Model State Idling Law. The U.S. Environmental Protection Agency has issued a Model State Idling Law document to provide guidance for states that develop their own idle regulations. Paul Bubbosh of EPA shared insights with us relating to the law.
- Emission Reduction Incentives for Off-Road Diesel Equipment Used in the Port and Construction Sectors. A number of states are adopting laws that limit vehicle and equipment idling: enforcement of these anti-idling regulations reportedly varies widely.
- Status Report on Clean Mobile Source Diesel Initiatives in The Northeast States and Eastern Canadian Provinces. A number of states in the Northeast report considerable success with anti-idling initiatives through education, rather than enforcement.

Idling at DistributionFacilities:

- Illinois Approves Idling Restrictions. Violators would face a fine of $50 for a first offense; a second or subsequent offense within any 12-month period would bring a $150 fine.
- Maricopa County Vehicle Idling Restriction Ordinance. Distribution center owners or operators are required to erect and maintain a permanent sign at least 12 inches by 18 inches in size indicating the maximum idle time allowed in the county, fines, and a phone number for further information.

Idling at Construction Projects:

- Connecticut Clean Air Construction Initiative. Truck staging zones will be established for diesel-powered vehicles waiting to load or unload materials. The zones will be located where diesel emissions will have the least impact on abutters and the general public. Idling will be limited to three minutes for delivery and dump trucks and other diesel-powered equipment with some exceptions.
- Construction Equipment Operating Restrictions. The Texas Commission on Environmental Quality (TCEQ) adopted a rule to restrict heavy-duty diesel construction equipment rated at 50 horsepower or more from operating from 6 a.m. through 12 p.m. from April through October, in an attempt to delay nitrogen oxides

emission and limit ozone production. Heather Evans -- Texas DOT and formerly of TCEQ -- shared insights with us relating to the rule.

- Cost-benefit Analysis of Equipment Idling Reduction and Control on Construction Sites. EPA is partnering with The Associated General Contractors of America on a research effort to analyze the costs and benefits of equipment idling reduction and control on construction sites. Peter Truitt of EPA discussed with us some of the initial findings related to idling, and pointed out several helpful resources for further information related to diesel equipment idling.
- Bay Area 2005 Ozone Strategy and Draft Environmental Impact Report – Summary. The Bay Area Air Quality Management District has drafted a control measure that would reduce emissions from the idling of diesel equipment through the voluntary adoption and enforcement of a model ordinance by local government agencies. Compliance by construction contractors could be promoted through informational materials provided by local governments, license renewals and/or mailings.
- Clean Construction Equipment -- Voluntarily Accelerating Emissions Benefits. Cost-effective measures that provide immediate and significant reductions without requiring infrastructure change include retrofitting with pollution control devices, replacing old engines, using low sulfur fuel or fuel additives, and repairing/rebuilding existing engines (smoke testing programs). Idling restrictions for construction equipment may be applied through government contracts.

Overview

Model State Idling Law

United States Environmental Protection Agency, April 2006
http://www.epa.gov/smartway/documents/420s06001.pdf.
EPA has issued a Model State Idling Law document to provide guidance for states that develop their own idle regulations. The model law is a brief, 14-page informational document based on the existing idle regulations in several states, aimed at assisting states and the trucking industry with the development of, and compliance with, state idling regulations.

Stipulations in the model law include:
(c) General Requirement for Load/Unload Locations. No load/unload location owner shall cause vehicles covered by this rule to idle for a period greater than 30 minutes while waiting to load or unload at a location under their control.
(d) General Requirement for Vehicles. No owner or operator of a vehicle shall cause or permit vehicles covered by this rule to idle for more than five minutes in any 60-minute period except as noted in sections (e) and (f), and except as provided in section (c) in the case of a load/unload location.
(h) Penalties. The owner and/or operator of a vehicle, and/or the owner of a load/unload location, who is in violation of this law is responsible for penalties as follows--

(1) First offense- warning ticket issued to vehicle driver and owner, and where applicable, the load/unload facility owner.
(2) Second and subsequent offenses- $150 citation is issued to the vehicle driver; and/or, $500 citation issued to the registered vehicle owner or load/unload location owner.

The EPA said it is not developing any federal regulations pertaining to vehicle idling.

Helpful insights concerning the Model State Idling Law were obtained from Paul Bubbosh, Office of Transportation and Air Quality- U.S. Environmental Protection Agency (phone: 202-343-9322, email: Bubbosh.Paul@epa.gov). Paul told us that, “With distribution centers and things of that nature, the language that is very on-key here, on-point, is when a law says that no person ‘shall cause or permit…’ By that interpretation, one could go to a Wal-Mart, for instance, and say, ‘You are allowing idling on your premises, and therefore we are going to give you a ticket.’ We actually, from a policy perspective, don’t think that’s very smart, unless Wal-Mart controls the behavior of those vehicles. For example, if the loading dock at Wal-Mart is so backed up that trucks are having to idle, then Wal-Mart is causing the idling. But if it’s 3 in the morning, and there’s a truck driver parked in the far corner of a Wal-Mart lot, and a police officer writes Wal-Mart a ticket, well, Wal-Mart really has no control -- they’re not causing that person to idle.

“There’s been a groundswell, a huge momentum, of states reaching for this tool (the model law) as a means to control idling in their area. And I think that’s fine -- I think the laws, if enforced, will work. But you have to come up with a law that’s practical, and that’s consistent with what the various jurisdictions are doing, if you want to get compliance. We are writing a handbook on how to improve enforcement of idling laws. One of the most important

things is signage. A lot of drivers simply do not know what the law is in the area they're traveling in, and there's great inconsistency, not only between states, but within a state, between state law and county law. One thing we're seeing is that granting parking enforcement officials the ability to actually write tickets for excessive truck idling has been much more effective than giving that authority to state environmental officers or state police officers.

"I think when you talk about construction vehicles or idling at distribution centers, you're welcome to use the hammer approach, but if you're going to use the hammer approach, we would recommend that you also use a carrot approach. Once way to do a carrot approach is to ask a facility such as a truck stop or a distribution center to join EPA's SmartWay Transport Partnership (see http://www.epa.gov/smartway/). We verify serious efforts to effect idling reductions at these types of facilities, and the operators of these facilities get some recognition as being a SmartWay partner: they're facilitating meeting our goals which have to do with reducing idling and reducing emissions."

Emission Reduction Incentives for Off-Road Diesel Equipment Used in the Port and Construction Sectors
United States Environmental Protection Agency -- Office of Policy, Economics and Innovation, May 19, 2005
http://www.epa.gov/sectors/pdf/emission_20050519.pdf.
Page 26 -- State and Local Anti-Idling Regulations
A number of states have adopted laws that limit vehicle and equipment idling, and many of these laws apply to both on-road and off-road vehicles. Enforcement of these anti-idling regulations reportedly varies widely. Many of the laws have been adopted only recently, and some jurisdictions have not yet established procedures for enforcing the restrictions. For a list of many of the laws, see http://www.epa.gov/otaq/smartway/idle-state.htm.

Status Report on Clean Mobile Source Diesel Initiatives in The Northeast States and Eastern Canadian Provinces
Acid Rain Steering Committee, Committee on the Environment, New England Governors/Eastern Canadian Premiers Conference, September 2003
http://www.nescaum.org/documents/rpt030901negecp-retrofit.pdf/.
Page 30 -- b) Idling Issues: i) User Perspective
While many idling scenarios are unnecessary and needlessly contribute to excess emissions – school and urban bus idling during temperate weather conditions, and delivery vehicle idling during pick-up and delivery, for example – many situations do require some sort of power source, usually for electrical supply of heating. Typically power is provided from an idling engine. Unfortunately, there exists considerable misunderstanding in differentiating between these legitimate power needs, and from unnecessary, wasteful and harmful excessive idling. It is a fallacy, for example, that continued idling of diesel engines promotes enhanced engine performance or prolongs engine life.

Page 32 -- c) States' Programs
Because of the misconceptions surrounding idling, many state initiatives, whether mandatory or optional (sometimes with incentives), incorporate educational components to dispel the types of myths illustrated above. Similarly, while anti-idling initiatives are significantly more cost-effective than the implementation of retrofit technology as an emission reduction approach, idling changes are in and of themselves behavioral changes, and behavior modification may prove as challenging, albeit for different reasons, as the technical challenges of retrofits. Nevertheless, a number of states in the Northeast report considerable success with anti-idling initiatives through education, rather than enforcement, especially for school bus drivers. As of June 2003, Connecticut, Massachusetts and New Hampshire have anti-idling regulations, while Maine, Rhode Island and Vermont do not. Extending beyond the New England area, New Jersey, New York and Maryland also have anti-idling regulations. A synopsis of anti-idling regulations is shown below:

State	Idling Limit	Applicability	Exemptions Allowed?	Is There Enforcement?	Are There Penalties?
CT	3 mins	Autos, Buses, Trucks, Nonroad Equipment	Yes	Yes	Yes
MA	5 mins, 30 for diesel locomotives	All on-highway vehicles and locomotives	Yes	Yes	Yes
NH	5 mins; 15 mins for temps below 32°F	All heavy-duty on-highway vehicles	Yes		Yes, but rarely enforced
NJ	3 mins, other specialty provisions	All on-highway vehicles	Yes	Yes	Yes, with enforcement
NY City	5 mins	All on-highway vehicles	Yes	Yes	Yes, with enforcement
NY State	5 mins	All heavy-duty on-highway vehicles	Yes	Yes	Yes, with enforcement
MD	5 mins	All on-highway vehicles	Yes	Yes	Yes, but rarely enforced

ME, RI and VT have no anti-idling regulations

Anti-idling regulations for these states have a number of common elements. They all allow a maximum allowable idling time limit, all define on-highway vehicles to include diesel-powered trucks, schools buses and urban transit buses, all provide for specific, similar exemptions, all have some form of enforcement authority though the enforcement agency may differ, and all mandate civil penalties for non-compliance. Enforcement and levying of penalties is a recurring problem for all those states that have promulgated idling regulations. Resource limitations, lack of familiarity with the law by some agencies responsible for enforcement, perceptions that enforcement of idling restrictions is not a major issue when compared to criminal acts, and so on, have conspired to make idling regulation enforcement a challenge for the Northeast states. In contrast, success in *empowering* drivers to reduce idling, as in a number of cases with school bus drivers, appears to be the most effective approach to a successful idle reduction program.

Idling at Distribution Facilities

Illinois Approves Idling Restrictions

Illinois General Assembly, Public Act 094-0845, July 1, 2006
http://www.ilga.gov/legislation/publicacts/fulltext.asp?Name=094-0845.
Illinois has adopted rules prohibiting diesel-powered vehicles with a gross vehicle weight of more than 8,000 pounds from stationary idling longer than 10 minutes per hour in nine state counties, including the City of Chicago. While waiting to weigh, load or unload cargo or freight, truckers would have their idling limited to no more than 30 minutes per hour, unless they are in a line of vehicles that regularly and periodically moves forward. Violators would face a fine of $50 for a first offense. A second or subsequent offense within any 12-month period would result in a $150 fine. The law allows certain exemptions.

Maricopa County Vehicle Idling Restriction Ordinance

Maricopa County Air Quality Planning and Analysis Division (Rules and Emissions Inventory), June 26, 2002
http://www.maricopa.gov/aq/rules/docs/fin-VIRO.pdf.
Maricopa County encompasses Phoenix, Scottsdale and Tempe, Arizona, and this ordinance describes restrictions for diesel idling in the county. Except as provided in Section 4 of the ordinance (Exemptions), idling time is restricted to five consecutive minutes for any device or combination of devices that meet the following criteria:
- designed with a gross vehicle weight rating of more than 14,000 pounds;
-. required under Arizona law to be registered;
-. designed to operate on public highways; and
-. powered by a diesel engine.
Vehicle owners or operators who violate the ordinance are subject to a civil penalty of $100 for the first violation and $300 for a second and subsequent violations. Truck stop and distribution center owners or operators are required to erect and maintain a permanent sign(s) at least 12 inches by 18 inches in size indicating the maximum idle time allowed in Maricopa County. The owners/operators are required to post the sign(s) in a conspicuous location, near the dispatcher if applicable. In addition, the sign(s) should at a minimum contain language outlining the county's vehicle idling information line, and the amount of money a violator will be fined.

Idling at Construction Projects

Connecticut Clean Air Construction Initiative

http://www.i95newhaven.com/poverview/environ_init.asp.

To help improve air quality in Greater New Haven, the Connecticut DOT is implementing new methods for reducing emissions during the I-95 New Haven Harbor Crossing Corridor Improvement Program. During construction, equipment used on highway contracts will be part of a pilot emissions reduction program for the State of Connecticut. ConnDOT is requiring all contractors and subcontractors to take part in the initiative. Contractor requirements include the following:

-- Truck staging zones will be established for diesel-powered vehicles waiting to load or unload materials. The zones will be located where diesel emissions will have the least impact on abutters and the general public.

-- Idling will be limited to three minutes for delivery and dump trucks and other diesel-powered equipment (with some exceptions).

Initial and monthly reporting by contractors will help to ensure proper implementation of the initiative, and non-compliance will be enforced.

Construction Equipment Operating Restrictions

Texas Commission on Environmental Quality (TCEQ)

http://www.tceq.state.tx.us/implementation/air/sip/construction.html#Rules.

In December 2000, TCEQ adopted a rule to restrict heavy-duty diesel construction equipment rated at 50 horsepower or more from operating from 6 a.m. through 12 p.m. from April through October, in an attempt to delay nitrogen oxides emission and limit ozone production. The affected ozone nonattainment areas were Houston-Galveston-Brazoria and Dallas-Fort Worth. The restriction was an enforceable control strategy under Texas' State Implementation Plan that was subsequently repealed and replaced by the Texas Emission Reduction Plan (TERP) http://www.tceq.state.tx.us/implementation/air/terp/index.html) in September 2001.

Helpful insights concerning the rule were obtained from Heather Evans, Air Quality Specialist- TxDOT Environmental Affairs Division (phone: 512-416-2621, email: HEVANS@dot.state.tx.us).

Heather was a TCEQ employee at the time that the rule was adopted and played a key role in developing it. "At the time were doing this we were kind of taking the lead," Heather says. "Part of it was we had so much further to go in ozone control than everyone else in the country, except for California, that nobody else was even close to coming up with such crazy ideas at the time. But at the time, because of the extreme gap that we had in terms of actually pulling together a full plan that showed we were going to contain the ozone theater in Houston, we really needed everything we could do. It's such an interesting issue down here, particularly because of the heat. Pushing back the time people can be out there until later when it's extremely hot – restricting them from being able to get out there first thing in the morning – was not popular. At that time, we had also been working with EPA on trying to figure out how to get a program, which now is the TERP program, going here in Texas. The legislature did repeal the operating restrictions rule during its next session, but they also enacted the TERP program, which provides a comprehensive set of incentive programs aimed at improving air quality in Texas. So the outcome was a successful one for us."

Cost-benefit Analysis of Equipment Idling Reduction and Control on Construction Sites

Contacts:

- Peter Truitt, Sector Strategies Division- U.S. Environmental Protection Agency, phone: 202-566-2970, email: Truitt.Peter@epamail.epa.gov.
- Leah Pilconis, Senior Counsel Environmental Law- The Associated General Contractors of America, phone: 703-837-5332, email: WOODL@agc.org.

EPA is partnering with The Associated General Contractors of America on a research effort to analyze the costs and benefits of equipment idling reduction and control on construction sites. A final report on the research was expected to be completed soon by consultant ICF Inc. Peter shared with us some of the initial findings related to idling. "A large diesel engine on a construction site uses up about a gallon of fuel per hour of idling," Peter said. "By implementing equipment idle reduction and control measures on construction sites, you could eliminate particulate matter reductions of about 2.5 grams per hour of idling for a particular piece of equipment. We've been gathering information from companies that have cut back on idling about what's generally required (see How To do It, below). There are no real capital costs associated with implementing these measures, though there may be some operational costs due to scheduling and staging. We're getting information like older engines need about a two-minute shut-down period, and the new engines need almost none. There's a lot of unnecessary idling going on. A lot of equipment operators thought that idling is more necessary in older equipment, and the cost of starting up equipment

after you shut it off is quite high for older equipment. But we're finding that's just not true for the newer equipment. It's kind of like an old wives' tale that's hung around in the industry by diesel equipment operators. The old belief that it costs a lot to shut off and then start up equipment isn't true anymore."
How to do it:

- Equipment operator training
  Limit idle time at shutoff – older engines need two-minute shutdown, new engines need almost none.
  Turn off dump trucks that are waiting to load or unload longer than five minutes.
  Restrict morning warm-ups to three to five minutes (check with manufacturer).
  Turn off equipment when not in use.
- Implement firm idle reduction policy
- Use automatic vehicle shutdown
- Track equipment idling by vehicle, site or operator – post the results
- Track overall fuel usage by vehicle, site or operator – post results
- Fuel incentive \ idle reduction bonuses
- Reduce idling for pickup and delivery vehicles for supplies
- Use SmartWay carriers for freight shipments
- Staging area for vehicles waiting to access the site that is far away from the public
- Locate generators and other equipment away from fresh air intakes

Peter and Leah also identified the following resources for further information related to diesel equipment idling:
* National Idling Reduction Network News
The National Idling Reduction Network brings together trucking and transit companies, railroads, equipment manufacturers, local, state and federal government agencies (including regulators); and national research laboratories to identify consistent, workable solutions to heavy vehicle idling for the United States.
http://www1.eere.energy.gov/vehiclesandfuels/resources/fcvt_national_idling.html.

* Incentives and Funding Opportunities for Idling Reduction Projects
DOE's Clean Cities program provides a listing of federal and state programs that offer incentives and funding for idling reduction projects. Further information can be found at
http://www.eere.energy.gov/cleancities/idle/incentives.html.

* The West Coast Diesel Collaborative has a comprehensive listing of grant and loan programs available from many states to purchase or apply for a loan for on-board idling reduction equipment. For the listing of these programs, see http://www.westcoastdiesel.org/programs.htm.

* Argonne National Laboratory has added a new cost worksheet on its Web site (http://www.transportation.anl.gov/pdfs/EE/361.pdf) to enable truck owners to calculate the savings and payback time from using on-board idling reduction equipment or electrified parking spaces. Contact Linda Gaines at lgaines@anl.gov.

-- Sources:
U.S. EPA, Idling Vehicle Emissions, EPA420-F-98-014, April 1998
Washington State University Extension Energy Program – Idling Restrictions
Washington State University Extension Energy Program – Construction Equipment.

Bay Area 2005 Ozone Strategy and Draft Environmental Impact Report -- Summary
The Bay Area Air Quality Management District, the Metropolitan Transportation Commission and the Association of Bay Area Governments, October 2005
http://www.baaqmd.gov/pln/plans/ozone/2003_workgroup/os_deirsummary.pdf.
The Bay Area Air Quality Management District (BAAQMD) has drafted a control measure that would reduce emissions from the idling of diesel equipment through the voluntary adoption and enforcement of a model ordinance by local government agencies. The control measure -- MS-1, Diesel Equipment Idling Model Ordinance -- would potentially apply to all diesel-fueled medium and heavy-duty trucks, heavy-duty urban buses and preliminary estimates of construction equipment rated at 75 horsepower or greater operating in the district. General idling would be limited to five minutes per location for all applicable diesel equipment. Benefits would include emissions reduction from heavy-duty trucks at warehouse/distribution centers. Compliance by construction contractors could be promoted through informational materials provided by local governments, license renewals and/or mailings. MS-

1 was tentatively slated for implementation in 2006, and may be viewed online at http://www.baaqmd.gov/pln/plans/ozone/2003_workgroup/owg_may04/msmeasures_052004.pdf.

Clean Construction Equipment -- Voluntarily Accelerating Emissions Benefits
Northeast Association of State Transportation Officials Briefing Paper, 2004
http://www.dot.state.ny.us/nasto/emphasis-areas-files/air%20quality/nasto_const%20equip_whitepaper.doc.
In May 2004 EPA announced a comprehensive rule to reduce emissions from nonroad diesel engines (Clean Air Nonroad Diesel - Tier 4 Final Rule, http://www.epa.gov/nonroad-diesel/2004fr.htm). The new engine standards will take effect in 2008 and will be fully phased in by 2014 for new engines only, and apply to nonroad diesel engines used in most construction, agricultural, industrial and airport equipment. While the rule applies only to new engines, many of the same advances used on new engines can be applied to older ones, resulting in a cost-effective emissions reduction solution. States have the ability to voluntarily reduce emissions in advance of the rule dates. Cost-effective measures that provide immediate and significant reductions without requiring infrastructure change include retrofitting with pollution control devices, replacing old engines, using low sulfur fuel or fuel additives, and repairing/rebuilding existing engines (smoke testing programs). Idling restrictions for construction equipment may be applied through government contracts. Any or all of these measures can be implemented with state-owned and operated vehicles. State governments may consider requiring contractors using construction equipment on government jobs to implement one or more of these measures.